What is claimed is:

1. A computer assisted method is provided for diagnosing a condition of a subject wherein said condition is associated with an activation in one or more regions of interest, said method comprising:

5   having said subject perform a behavior or have a perception adapted to selectively activate said one or more regions of interest associated with said condition;

      measuring activity of said one or more regions of interest as said behavior is being performed or said subject has the perception;

      diagnosing said condition associated with said one or more regions of interest

10 based on said activity in response to the behavior or perception;

      performing an intervention; and

      repeating this process one or more times at a later time and observing changes between measurements before and after said intervention.

2. A method according to claim 1 wherein said measuring activity is preformed by

15 fMRI.

3. A method according to claim 1 wherein the measuring activity is made in less than 10 seconds relative to when the activity is measured.

4. A method according to claim 1 wherein said intervention comprises an application of a pharmacological agent.

20 5. A method according to claim 1 wherein said intervention comprises an application of a therapeutic method.

6. A method according to claim 1 wherein said diagnosing is made while an instrument used for measurement remains positioned about said subject.

7. A method according to claim 1 wherein said method further comprises selecting

25 one or more of internal voxels corresponding to a region of interest for said subject and using said selected internal voxels to make one or more diagnoses.

8. A method according to claim 7 wherein said measuring is made using an apparatus capable of taking measurements from one or more of said internal voxels without substantial contamination of said measurements by activity from regions intervening

between said internal voxels and location where said measurement apparatus collects the data.

9. A method according to claim 7 wherein said measuring is made from at least 100 separate internal voxels at a rate of at least once every five seconds.

10. A method according to claim 7 wherein said measuring is made from a set of separate internal voxels corresponding to a scan volume including the entire brain.

11. A method according to claim 7 wherein said measuring is made from at least 100 separate internal voxels and wherein said internal voxels have a total three-dimensional volume of 5x5x5cm or less.

12. A method according to claim 7 wherein said measuring is made from at least 100 separate internal voxels and wherein said internal voxels have a total three-dimensional volume of 1x1x1cm or less.

13. A method according to claim 7 wherein the region of interest is selected from the group consisting of subthalamic nucleus, substantia nigra, thalamic nucleus VA ventro anterior, nucleus accumbens, thalamic nucleus VL ventrolateral, globus pallidus internus, pulvinar nucleus, thalamic nucleus VP, locus coeruleus, globus pallidus externus, amygdala, medial frontal lobe, periaqueductal gray matter, nucleus raphe dorsalis, nucleus basalis of Meynert, dorsolateral pre-frontal cortex, anterior pre-frontal cortex, rostral ventromedial medulla, nucleus raphe magnus, thalamic nucleus Vim ventrointernomedial, Brodmann's area 4, Brodmann's area 6.

14. A method according to claim 1 wherein said one of said regions of interest has a primary function of releasing a neuromodulatory substance.

15. The method according to claim 14 wherein said neuromodulatory substance is selected from the group consisting of: dopamine, acetyl choline, noradrenaline, serotonin, and endogenous opiate.

16. A method according to claim 1 wherein said subject has one or more of the following conditions: Parkinson's disease, Alzheimer's disease, attention deficit disorder, depression, substance abuse, addiction, and schizophrenia.

17.   A method according to claim 1 wherein information is communicated to said subject to perform a behavior or have a perception by a manner selected from the group consisting of: providing audio to the subject, providing tactile stimuli to the subject, providing a smell to the subject, displaying an image to the subject, communicating a set of instruction, and communicating material to be learned.

18.   Computer executable software is provided for guiding brain activity testing, the software comprising: logic for communicating instructions to a subject to perform a first behavior and/or a first stimulus to the subject; logic for taking activity measurements of one or more regions of interest of the subject in response to the first behavior or first stimulus and selecting a second behavior or a second stimulus for activating the one or more regions of interest based, at least in part, on the measured brain activity; and logic for communicating instructions to the subject to perform the second behavior and/or the second stimulus to the subject; logic for testing the activity measurements and performing a diagnosis of the subject or of the efficacy of an applied intervention.

19.   Software according to claim 18 wherein the software performs the determinations in less than 10 seconds relative to when the brain activity measurement is taken.

20.   A method of diagnosing a subject comprising:
    (a)   measuring activity of one or more internal voxels of said subject's brain;
    (b)   communicating instructions to said subject derived from said measured activity in real time; and
    (c)   having said subject perform a behavior in response to said instructions in real time.

21.   A method according to claim 20 wherein said measuring is performed by fMRI.

22.   A method according to claim 20 wherein said measuring is made from at least 100 separate voxels.

23.   A method according to claim 20 wherein said instructions are derived through a computer executable logic process of selecting from a set of possible instructions based upon the brain activity measured.

24.   A method according to claim 20 wherein a computer executable logic is employed to cause the instructions to be communicated to the subject.

25.   Computer executable software, the software comprising:

logic for taking activity measurements of one or more localized brain regions as an intervention is performed and for communicating information to a subject or a device operator based on measured brain activity in substantially real time relative to when the intervention is performed,

wherein the logic takes new activity measurements as they are received and communicates new information based on new activity measurements.